

# Common Digestive and Liver Diseases among 5880 Patients Admitted to Shariati Hospital, Tehran, Iran during 2000-2009

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## ABSTRACT

### BACKGROUND

Digestive and liver diseases (LD) are among the most common causes of mortality and morbidity in Iran and throughout the world. We have aimed to report the etiology and outcome of gastrointestinal and LD that needed admission in a typical tertiary referral hospital in Tehran during the last decade.

### METHODS

Shariati Hospital Gastroenterology and Liver Disease Department (GI & LD) was established in 1974. Information on admitted patients in this department, such as age, gender, clinical, laboratory and imaging results, final diagnosis (according to ICD-10), and hospital outcome have been regularly collected by a special summary form since 1999. For this study, the results were analyzed and compared for two, 5-year time periods, 2000-2004 and 2005-2009.

### RESULTS

There were 5880 patients (64.60% male) with a mean age of 51.8 years (range: 12 to 90 years) who were admitted. The hospital mortality rate was 6.80%, of which 71.53% were male. The most common cause of hospital admission (39.25%) and mortality (38.55%) was chronic LD. The most common etiologies for admission in both genders were HBV and cryptogenic or non-alcoholic fatty LD (NAFLD) induced cirrhosis of the liver. Other common etiologies were gastrointestinal bleeding, HCV-induced cirrhosis, and CBD stones in male patients; CBD stones, gastrointestinal bleeding and autoimmune hepatitis in female patients. The rate of admission due to HBV-related LD decreased from 21.73% to 11.15%, while admission due to NAFLD-related liver (cryptogenic) disease remained unchanged (11.60% to 10.49%). The rate of admission for pancreatic cancer increased from 1.71% to 4.56%, CBD stones from 6.96% to 10.22%, cholangitis from 3.37% to 6.93%, acute pancreatitis from 2.54% to 4.65%, and Crohn's disease from 1.93% to 2.72%.

### CONCLUSION

End-stage LD secondary to viral, autoimmune and NAFLD constitute the etiology of up to 50% of admissions and mortalities in Shariati Hospital for both genders. While the admission rate of HBV-related LD is declining, the rate of NAFLD-related LD remains stable. The rates of admission for pancreatic cancer, CBD stone, cholangitis, acute pancreatitis and crohn disease increased over the decade.

### KEYWORDS:

Digestive disease; Outcome; Hospital admission rate; Iran

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## INTRODUCTION

Digestive and liver diseases (LD) are among the most common causes of chronic diseases with significant mortality and morbidity in Iran and throughout the world.<sup>1-3</sup> According to the World Health Organization in 2004, digestive diseases had constituted the eighth cause of death and was the etiology of death in 3.2% of females and 3.8% males worldwide.<sup>1</sup> Diarrheal disease comprised 2.2 million deaths, stomach cancer 0.8 million, cirrhosis of the liver 0.8 million, and colorectal cancers comprised 0.6 million deaths according to WHO 2004 statistics, which equaled 7.6% of total causes of death.<sup>1</sup>

Digestive and LD are significant contributors to the chronic disease burden and health-care cost in the USA.<sup>3,4</sup> The worldwide ranking of cancer causes of death reveals that stomach cancer is the second most common among males, followed by liver (third), colorectal (fourth), esophageal (fifth) and pancreatic (eleventh) cancers. Among females, stomach cancer is the third most common cause of cancer deaths followed by liver (fourth), colorectal (sixth), esophageal (seventh), and pancreatic (tenth) cancers.<sup>1</sup>

In the Islamic Republic of Iran, both malignant and nonmalignant gastrointestinal and LD together were responsible for about 10% of deaths in the year 2002 and ranked second (after cardiovascular diseases) among the non-accidental causes of death in Iran.<sup>4,5</sup> About 38% of deaths from cancer belonged to digestive and liver cancers.<sup>5</sup>

Information about digestive and LD that result in hospitalizations, their high costs, and morbidity and mortality over a period of time, in addition to their trends are necessary and valuable references for health policy makers and clinicians. Such information could help generate new hypotheses for scientists in this field and lead to further, more relevant research and preventive measures.

This study aimed to report the etiology and outcome of gastrointestinal and LD that required admission to a typical tertiary referral hospital in Tehran during the last decade.

## MATERIALS AND METHODS

Shariati Hospital was established in 1974 as a general Tehran University affiliated teaching hospital, as a new, well-equipped hospital with one of the first CT scanners in Iran and the region. The majority of staff were recruited from among Iranian physicians who had graduated from the USA and Western Europe. During the last 37 years, this hospital has served as one of the top tertiary referral centers for the entire country. The Gastroenterology and Liver Disease Department (GI & LD) of this hospital was the first subspecialty gastroenterology teaching ward in Iran. During the last decade, the GI & LD Department was a 30-bed ward with 13 attending gastroenterologists and 10 gastrointestinal fellows. Each year an average of 3000 upper and 2000 lower endoscopies, 1000 endoscopic sonographies and 500 therapeutic ERCP procedures have been performed in the Endoscopy Department. Over 7500 patients have attended the GI & LD outpatient department. Thus, this department is one of the top gastrointestinal referral centers that accepts patients from throughout Iran. Shariati Hospital had very active Oncology and Gastrointestinal surgery wards during the period of this study. The majority of malignant gastrointestinal and LD as well as other surgical digestive disease patients, when diagnosed as outpatients or in the emergency room, were directly admitted to the Surgery or Oncology wards rather than being admitted to the Gastrointestinal ward.

Print discharge summary sheets with the same structure were completed by medical residents under the supervision of gastroenterology fellows, after which they were signed by the attending consultant during the study period. A database specially designed for digestive and

LD with a detailed discharge summary from all patients (age, gender, clinical, laboratory, imaging and para-clinical results, final diagnosis according to ICD-10, and hospital outcome) who were admitted to the GI & LD Department was established in 1999. All information was collected regularly during the last decade. The final discharge diagnoses were placed into the following five categories: LD, non-tumoral gastrointestinal diseases (NTGI), pancreatobiliary diseases (PBD), gastrointestinal malignancies (GIM), and those with other diseases (OD). The results were analyzed and compared for two, 5-year time periods from 2000-2004 and 2005-2009. Data were collected and analyzed with SPSS version 16 software.

## RESULTS

There were 5880 patients (64.60% male) admitted to this ward from 2000-2009. The mean age was 51.89 years (range: 12 to 90 years). LD (39.25%) were the most common diseases, followed by NTGI (28.25%), PBD (21.27%) and GIM (9.62%) among hospitalized patients.

A total of 397 patients died during hospital admission, which equaled a 6.75% hospital mortality rate. Of these, 71.53% were males ( $p = 0.003$ ). This rate has not changed significantly during the study period. Despite the lower mean age in patients with chronic LD, the hospital mortality rate of this category was higher (Table 1). The main causes of death among admitted patients were: HBV-induced liver cirrhosis (17.38%), cryptogenic- (NAFLD) induced cirrhosis (10.83%), non-variceal gastrointestinal bleeding (7.55%), HCV-induced cirrhosis (5.54%), cholangiocarcinoma (5%), autoimmune-induced cirrhosis (4.785), liver metastasis (3.52%), gastric cancer (3.27%), sepsis and septic shock (3.02%), acute LD (2.77%), and ascending cholangitis (2.77%).

The ratio of male to female was higher for LD (2.06) and malignancies (2.21) in comparison to PBD (1.31). The most prominent male

to female ratio was in HBV-induced LD, GIB, HCV induced liver disease, gastric ulcer, gastric cancer, esophageal cancer, HCC, and cholangiocarcinoma with ratios of more than 2. For autoimmune liver disorders, PBC, and acute pancreatitis, this ratio was less than 1.

The first 20 most common digestive and LD according to discharge diagnoses during the period of study are summarized for male and female patients in Table 2.

The rate of admission due to HBV-induced LD has decreased from 21.73% to 11.15% while other causes of chronic LD such as cryptogenic or NAFLD-induced liver cirrhosis has not changed significantly. The rate of admission for pancreatic cancer increased from 1.71% to 4.56%, CBD stone from 6.96% to 10.22%, cholangitis from 3.37% to 6.93%, acute pancreatitis from 2.54% to 4.65%, and Crohn's disease from 1.93% to 2.72% (Table 3).

## DISCUSSION

This study demonstrated a sharp decline in the rate of hospital admissions due to HBV-induced LD from 21.73% in the first 5-year study period to 11.15% during the second 5-year study period. The universal neonatal and family members of HBV-infected patients vaccination program since 1993, along with availability of medical experts and anti-viral medications in Iran were the major reasons for this decline.

According to the most recent population-based seroprevalence study of HBV in three provinces of Iran, a tendency for decreasing the rate of HBV infection, particularly among young people was evident. The rate of HBV infection declined from 1.3% in 1991 to 0.8% in 1999 for the 2-14 year age group in one study.<sup>6</sup> Several other studies have revealed that the prevalence of HBV infection among blood donors has declined significantly from 1.79% in 1998 to 0.4% in 2007.<sup>7,8</sup> We should expect a further decline in the

**Table 1:** Digestive and liver disease categories and related hospital mortalities in patients admitted to Shariati Hospital GI & LD ward (2000-2009).

Disease categories	Male gender (%)	M/F	Age (mean)	Hospital mortality (%)
Liver disease (N=2308)	67.33*	2.06*	48.61±17.57*	9.79*
Non-tumoral disease (N=1661)	64.96	1.85	49.22±21.01*	3.85*
Pancreatobiliary (N=1251)	57.31*	1.34*	58.39±17.65*	4.07*
Malignancies (N=565)	68.85**	2.21**	58.54±16.74*	7.61
Other diseases (N=95)	63.15	1.71	55.54±20.50	13.6*
Total (N=5880)	64.60	1.82	51.89±19.12	6.75

\*Significant difference between gender, mean age, and hospital mortality in disease categories with  $p < 0.001$ .

\*\*Significant difference between gender, mean age, and mortality in disease categories with  $p < 0.05$ .

**Table 2:** The twenty most common digestive and liver disease discharge diagnoses in Shariati Hospital between 2000 and 2009 (N=5880).

Diagnosis	ICD-10 cod	Male	Female	Total (%)
HBV-induced liver cirrhosis	K74 (B18.1)	529	118	647 (15.83)
Cryptogenic or NAFLD- induced cirrhosis	K74.6	291	158	449 (10.99)
Common bile duct (CBD) stone	K80.5	182	177	359 (8.78)
Gastrointestinal (GI) bleeding	K92.2	259	94	353 (8.63)
Autoimmune hepatitis- (AIH) induced liver cirrhosis	K75.4	90	170	260 (6.36)
Hepatitis C virus (HCV)- induced liver cirrhosis	K74 (B18.2)	201	48	249 (6.09)
Acute cholangitis	K83	128	91	219 (5.35)
Cholangiocarcinoma	C22.1	119	54	173 (4.23)
Gastric cancer	C16	118	46	164 (4.01)
Ulcerative colitis	K51	78	85	163 (3.99)
Duodenal ulcer	K26	125	30	155 (3.79)
Acute pancreatitis	K85	75	77	152 (3.71)
Pancreatic cancer	C25	88	47	135 (3.30)
Gastric ulcer	K25	90	27	117 (2.86)
Crohn's disease	K50	57	40	97 (2.37)
Primary biliary cirrhosis (PBC)	K74.3	42	47	89 (2.17)
Hepatocellular carcinoma (HCC)	C22.0	61	23	84 (2.05)
Irritable bowel syndrome (IBS)	K58	42	35	77 (1.88)
Esophageal cancer	C15	56	21	77 (1.88)
Colon cancer	C18	43	25	68 (1.66)
Total	-----	2674 (70.39%)	1413 (67.90%)	4087 (69.50)

admission rate of HBV-infected chronic end-stage LD in the future.<sup>9</sup>

Despite the declining rate of HBV-related LD during the second 5-year study period, the rate of admissions due to other chronic LD remained stable. Due to the epidemic of obesity and meta bolic syndrome in Iran we should expect that end-stage LD due to NAFLD would gradually increase in the future, becoming the predominant etiology of end-stage LD among admitted patients.<sup>10, 11</sup> Other types of LD, particularly autoimmune hepatitis and primary biliary cirrhosis (PBC) in females along with

HCV-related LD and cholestatic LD (PBC and PSC) during this time period will continue to constitute an important fraction of chronic LD in the future.<sup>5</sup>

Referral bias is an important reason for increasing the admission rate of complicated gallstone disease, pancreatitis and pancreatic cancer. This, in part, may be because Shariati Hospital is among the most famous and active centers for advanced endoscopic services, which include ultrasonography and therapeutic ERCP in Iran. Admission of patients with digestive cancer in the Oncology and or Surgery ward and acute surgical digestive diseases in the Surgical

**Table 3:** Comparison of two, 5-year time intervals for the twenty most common digestive and liver diseases during 2000-2009 at Shariati Hospital, Tehran, Iran.

Diagnosis	ICD-10 code	2000-2004 Number (%)	2005-2009 Number (%)
<b>Cirrhosis based on HBV</b>	K74 (B18.1)	393 (21.73)	254 (11.15)
<b>Cryptogenic cirrhosis</b>	K74.6	210 (11.60)	239 (10.49)
<b>CBD stone</b>	K80.5	126 (6.96)	233 (10.22)
<b>Gastrointestinal bleeding</b>	K92.2	149 (8.23)	204 (8.95)
<b>Cirrhosis based on AIH</b>	K75.4	124 (6.85)	136 (5.97)
<b>Cirrhosis based on HCV</b>	K74 (B18.2)	112 (6.19)	137 (6.01)
<b>Cholangitis</b>	K83	61 (3.37)	158 (6.93)
<b>Cholangiocarcinoma</b>	C22.1	59 (3.26)	114 (5)
<b>Gastric cancer</b>	C16	68 (3.75)	96 (4.21)
<b>Ulcerative colitis</b>	K51	73 (4.03)	90 (3.95)
<b>Duodenal ulcer</b>	K26	79 (4.36)	76 (3.33)
<b>Acute pancreatitis</b>	K85	46 (2.54)	106 (4.65)
<b>Pancreatic cancer</b>	C25	31 (1.71)	104 (4.56)
<b>Gastric ulcer</b>	K25	65 (3.59)	52 (2.28)
<b>Crohn's disease</b>	K50	35 (1.93)	62 (2.72)
<b>PBC</b>	K74.3	49 (2.70)	40 (1.75)
<b>HCC</b>	C22.0	26 (1.43)	58 (2.54)
<b>IBS</b>	K58	45 (2.48)	32 (1.40)
<b>Esophageal cancer</b>	C15	35 (1.93)	42 (1.84)
<b>Colon cancer</b>	C18	23 (1.27)	45 (1.97)
<b>Total</b>	-----	1809 (68.86)	2278 (70.02)

Total numbers of patients during 2000-2004 were 2627. During 2005-2009, there were 3253 patients.

ward at Shariati Hospital is a reason for the lower admission rates seen with gastrointestinal and liver

cancers, appendicitis, hernias and other surgical digestive diseases in the GI & LD ward. The increasing rate of HCC admission despite the decrease in rate of HBV-induced LD may also be a referral bias.<sup>12</sup> The increasing rate of colorectal cancer and Crohn's diseases during the second 5-year study period may be real and has already been reported by other studies in Iran. In contrast to ulcerative colitis admissions, which have remained constant, the rate of admission due to Crohn's disease has increased. Despite reports of low prevalence and incidence rates of IBD that have been reported from Asia,<sup>13</sup> however the recent trends indicate a change in the epidemiology of IBD in Iran. There are some reports from Iran that have shown an increasing rate of Crohn's disease.<sup>14, 15</sup> The ratio of ulcerative colitis to Crohn's disease incidence rates has decreased from 4.0% to 2.3%, which is similar to the reports from our country. The prevalence of colorectal cancer is also in the rise in Iran according to Cancer Registry reports.<sup>16,17</sup>

The present study shows that the rate of admission due to peptic ulcer disease (DU(duodenal ulcer): 4.36% to 3.33%; GU(gastric ulcer): 3.59% to 2.28%) has decreased during this time period. This finding is also supported by a recently published study that has shown a significant decline in the rate of peptic ulcer disease during the period of this study in Tehran.<sup>18</sup>

The higher hospital mortality rate of other or non-gastrointestinal and LD may be due to co-morbid conditions such as cardiopulmonary and sepsis, and their complications in this group of patients. However, the mortality rate of malignancies or non-malignant gastrointestinal disorders may not be exact due to referral bias. The higher mortality rate of end-stage chronic LD may be due to difficulties and limitations for liver transplantation in this center and in Tehran during the study period.

This study had its own limitations, which included not being population-based and the fact that our database was limited to only one large tertiary hospital in Tehran, which as mentioned, was a possible cause of referral bias. Despite these limitations, studying



a large sample of admitted patients with definitive diagnoses over a decade allows us to draw some important conclusions. We can use these data for planning the educational objectives for postgraduate internal medicine and gastroenterology subspecialty programs.<sup>19, 20</sup> When combined with the outpatient clinic, cancer and death registry data, this information can assist policy makers to plan more realistic strategies for prevention and treatment of common digestive diseases and to better define research priorities in the field of digestive disease. This study would also help to design a larger study to look at the burden of gastrointestinal and LD in Iran. We can also measure our future success or failure at the next data update.

# CONFLICT OF INTEREST

The authors declare no conflict of interest related to this work.

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